

### Claims

1. A procedure for the realisation of ceramic manufactures, in particular tiles and trim pieces, made of porcelain stoneware, with anti-pollution properties, characterised by the fact that the said procedure, in combination with the production steps usual for the production of traditional ceramics, comprises the following phases:
  - application of a variable percentage of  $\text{TiO}_2$  with the covering glaze, the silk-screening pastes and the engobe;
  - application of a variable percentage of  $\text{TiO}_2$  with the layer covering the said manufactures;
  - application, with the covering layer, of particles of material designed to increase the refraction of the solar light to which the manufactures are exposed.;
  - addition of substances designed to absorb  $\text{NO}_x$  to the covering layer and/or to the material of which the engobe is composed;
  - creation of micro channels in the thickness of the covering layer of the ceramic manufactures, said micro channels being designed to increase the permeability to water of the said manufactures;
  - realisation of micro uneven-areas in the thickness of the aforesaid covering layer, said micro uneven areas being designed to increase the exchange surface between the single manufacture and the atmosphere;
  - insufflation of air during the traditional firing at  $1200^\circ\text{C}$ ; said insufflation being designed to produce and improvement in the photocatalytic effect of the  $\text{TiO}_2$ .
2. A procedure according to claim 1, characterised by the fact that the presence of the  $\text{TiO}_2$  in the single manufacture may vary from 1% to 25%.
3. A procedure according to claims 1 and 2, characterised by the fact that the  $\text{TiO}_2$  is used preferably in the form of Anatase.
4. A procedure according to claim 1, characterised by the fact that the materials designed to increase the refraction of the solar light to which the tiles are exposed are constituted, preferably, of white pigments and particles of silica; the said pigments and the said silica can both be applied to the same ceramic manufacture.
5. A procedure according to claim 1, characterised by the fact that the

application of the  $\text{TiO}_2$  to the covering layer is preferably obtained by means of an airbrush without air, functioning under high pressure; the engobe can also be applied following traditional methods, for example, by means of a disk booth.

6. A procedure according to claims 1 and 4, characterised by the fact that the application of the materials designed to increase the refraction of the solar light to which the tiles are exposed is obtained by means of silk-screening machines designed to apply glaze by means of silicone rollers according to the thickness wanted.
7. A procedure according to claim 1, characterised by the fact that the substances designed to facilitate the absorption of the  $\text{NO}_x$  are, preferably, Magalite and Zeolite and/or Petalite; the said Magalite is mixed in with the engobe, while the Zeolite and/or Petalite are mixed in with the glaze.
8. A procedure according to claims 1 and 7, characterised by the fact that the application to the covering layer of the substances designed to absorb  $\text{NO}_x$  is obtained by means of silk-screening machines designed to apply the glaze by means of silicone rollers according to the thickness wanted.
9. A procedure according to claim 1, characterised by the fact that the micro uneven areas are obtained by means of the action of silk-screening machine in which a silicone roller applies a first layer to the tile base directly.
10. A procedure according to claim 1, characterised by the fact that the micro channels are obtained by means of the action of a silicon roller.
11. A procedure according to claims 1, 6, 8 and 9 characterised by the fact that the application to the glaze of materials designed to increase the refraction of solar light and of substances designed to absorb  $\text{NO}_x$ , and the creation, also in the covering layer, of micro channels and uneven areas are obtained simultaneously through the use of four synchronised silicon rollers in the following order: a first roller creates micro uneven areas on the base of every single manufacture, a second roller applies the substance designed to absorb  $\text{NO}_x$ , a third roller applies the material designed to increase refraction and a fourth roller compacts everything, redefines the micro uneven areas and produces the micro channels.
12. A ceramic manufacture made of porcelain stoneware, characterised by the fact that the said item contains  $\text{TiO}_2$  in the form of Anatase and/or

Rutile, the said  $\text{TiO}_2$  is designed to give the aforesaid manufacture photocatalytic properties acting against the polluting and bacterial agents present in the atmosphere.

13. A ceramic manufacture according to claim 12, characterised by the fact that the said item is obtained by means of traditional firing with the addition of  $\text{TiO}_2$  in the form of Rutile only.
14. A ceramic manufacture according to claim 12, characterised by the fact that the said item is obtained by means of a modification of the firing phase to  $1200^\circ\text{C}$ .
15. A ceramic manufacture according to claims 12 and 14, characterised by the fact that the said item is obtained by means of a modification of the firing phase through insufflation of air which is followed by the application of a layer of  $\text{TiO}_2$  once the firing is complete.
16. A ceramic manufacture according to claims 12 and 15, characterised by the fact that the said item undergoes re-firing.
17. A first ceramic manufacture according to claims 12 to 16, characterised by the fact that the said item was obtained by means of:
  - engobe with substantially 25%  $\text{TiO}_2$  applied by means of an airbrush without air, functioning under high pressure;
  - silk-screening using iron molybdate;
  - calcic glaze with substantially 25%  $\text{TiO}_2$  applied by means of an airbrush without air, functioning under high pressure;
  - application of 100%  $\text{TiO}_2$  by silk-screening.
18. A second ceramic manufacture according to claims 12 - 16, characterised by the fact that the said item was obtained by means of:
  - engobe with substantially 25%  $\text{TiO}_2$  applied by means of a disk booth;
  - silk-screening using iron molybdate;
  - zinc glaze with substantially 25%  $\text{TiO}_2$  applied by means of an airbrush without air, functioning under high pressure;
  - application of 100%  $\text{TiO}_2$  by silk-screening.
19. A third ceramic manufacture according to claims 12 - 16, characterised by the fact that the said item was obtained by means of:
  - engobe with substantially 25%  $\text{TiO}_2$  applied by means of a disk booth;
  - silk-screening using iron molybdate;
  - glossy alkaline silica-boron glaze with substantially 25%  $\text{TiO}_2$  applied by means of an airbrush without air, functioning under

high pressure;

- application of 100% TiO<sub>2</sub> by silk-screening.

20. A fourth ceramic manufacture according to claims 12 - 16, characterised by the fact that the said item was obtained by means of:

- engobe with substantially 25% TiO<sub>2</sub> applied by means of an airbrush without air, functioning under high pressure;
- silk-screening using iron molybdate;
- glossy silica-boron-zirconium glaze with substantially 25% TiO<sub>2</sub>;
- application of 100% TiO<sub>2</sub> by silk-screening.

21. A fifth ceramic manufacture according to claims 12 - 16, characterised by the fact that the said item was obtained by means of:

- engobe with substantially 25% TiO<sub>2</sub> applied by means of an airbrush without air, functioning under high pressure;
- silk-screening using iron molybdate;
- application of 100% TiO<sub>2</sub> by means of an airbrush without air, functioning under high pressure;
- application of 100% TiO<sub>2</sub> by silk-screening.